Small-scale distribution of Baltic sprat: Statistical properties of school height, length and biomass imply school formation and species interaction mechanisms

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A 10 km acoustic transect in the central Bornholm Basin of the Baltic Sea has been sampled constantly sailing back and forth during a 48 h period. Sprat schools were identified and their height, width and acoustic backscatter as approximation for the fish density in each school were recorded using the Echoview software (Myriax) with the school detection module. School height, length and backscatter (nautical area backscattering coefficient) were all clearly log-normally distributed. Here, we present a simple mechanisms leading to the log-normal distributions, based on Gibrat's law of proportional growth, and discuss alternative causes for the observed apparent universality in the size distributions of the sprat schools. Furthermore, the observed aggregation pattern gives rise to several testable hypotheses on the school formation process and related species interactions during dusk and dawn which are developed and discussed.